Operations Scenarios - ECS Release B.0 Impacts

Technical Paper--Not intended for formal review or government approval.

February 1997

Prepared Under Contract NAS5-60000

RESPONSIBLE ENGINEER

Chin-Ho Lien /s/   2/27/97

Chin-Ho Lien, System Engineer   Date
EOSDIS Core System Project

SUBMITTED BY

Paul Palmer /s/   2/27/97

Paul Palmer, System Engineering Manager   Date
EOSDIS Core System Project

Hughes Information Technology Systems
Upper Marlboro, Maryland

This page intentionally left blank.

Abstract

This document provides temporary update to Release B SDPS/CSMS Operations Scenarios for the ECS Project (605-CD-002-001). This paper presents analysis results that depict some Release B.0 limitations and the effects on 605 operations scenarios, including workarounds to be used until Release B.1 is deployed. To completely address the Release B.0 workarounds documented in Release B Replan Functionality by Phase for the ECS Project (410-TP-004-001), two new scenarios are developed and presented in this paper. For a complete description of functionality deployed in Release B.0 vs. B.1, see the Release B Release Plan for the ECS Project (224-CD-001-001).

Keywords: Release B, Replan, Scenarios, Workarounds

This page intentionally left blank.

Contents

Abstract

1. Introduction

2. Related Documentation

3. Operations Scenarios Release B.0 Limitation Analysis

220-TP-001-001

4. New Operations Scenarios for Release B.0 Workarounds

Figures

Abbreviations and Acronyms

This page intentionally left blank.

1. Introduction

1.1 Purpose

This document provides temporary update to Release B SDPS/CSMS Operations Scenarios for the ECS Project (605-CD-002-001). The partition of ECS Release B capabilities between Release B.0 and B.1 introduces capability limitations that effect some of the 605 scenarios. This paper presents the limitations on the 605 operations scenarios that may incur during the Release B.0 time frame. The objective of this paper is not to rewrite the higher level descriptions of operations scenarios, but to pinpoint the capability limitations in the drill down scenarios. For easy cross reference, the title of each subsection uses the same drill down scenario title. To fully address the Release B.0 workarounds documented in Release B Replan Functionality by Phase for the ECS Project (410-TP-004-001), two new scenarios are developed and presented in this paper.

1.2 Organization

This paper is organized as follows:

Section 1:   Introduction - defines the purpose and outlines the content

Section 2:   Related Documentation

Section 3:   Operations Scenarios Release B.0 Limitation Analysis

Section 4:   New Operations Scenarios for Release B.0 Workarounds

Questions regarding technical information contained within this paper should be addressed to the following ECS contact:

- Chin-Ho Lien, System Engineer, (301) 925-1135, clien@eos.hitc.com

Questions concerning distribution or control of this document should be addressed to:

Data Management Office
The ECS Project Office
Hughes Information Technology Systems
1616 McCormick Drive
Upper Marlboro, MD 20774-5372

This page intentionally left blank.

2. Related Documentation

2.1   Parent Documents

The parent documents are the documents from which the scope and content of the paper are derived.

605-CD-002-001   Release B SDPS/CSMS Operations Scenarios for the ECS Project

420-WP-011-001   SMC Unattended Operations Scenarios for the ECS Project

224-CD-001-001   Release B Release Plan for the ECS Project

2.2   Applicable Documents

The following documents are either referenced within this paper, or are directly applicable, or contain policies or other directive matters that are binding upon the content of this document.

410-TP-004-001   Release B Replan Functionality by Phase for the ECS Project

605-CD-001-003   Operations Scenarios for the ECS Project: ECS Release A

This page intentionally left blank.

3. Operations Scenarios Release B.0 Limitation Analysis

This section documents the impacts of B.0 limitations on drill down scenarios in Science Operations, User Services, System Management, and System Stress Environments from 605 and scenarios from SMC Unattended Operations Scenarios (420-WP-011-001). For easy cross reference, the title of each section uses the same drill down scenario title as in these documents.

3.1 The Science Operations Environment

3.1.1 Earth Science Data Type Definition & Implementation

The capabilities described in the scenario are all provided in B.0. In the scenario, in order to develop a Descriptor File for a new ESDT, the developer needs to use a template and follow a developer's guide for creating an ESDT to create this descriptor file. To be more specific, Release B.0 uses the Descriptor File which is developed manually and by using prototype tool called M_POP. M_POP specifies the granule and collection level metadata attributes and their values automatically. Other Descriptor File data, including service definitions, and subscribable event definitions, are entered manually.

In B.0, new ESDTs are defined to ECS through an Operator GUI that makes the names of the Descriptor and DLL Files available to the SDSRV. Once the SDSRV receives the files, it "installs" the ESDT and notifies the necessary components of the system about the new ESDT. When notifications to the system components are completed, the ESDT can be used actively by the system.

3.1.2 Collection Instantiation

The features necessary for the SMC Accountant to provide system data collection and reporting functions, and to support each DAAC's accounting/accountability activities, e.g., adding accounting parameters for a newly registered and initialized ESDT, as described in the scenario will not be in B.0.

The automatic incorporation of new data collection by Data Management is not provided in B.0. In the B.0 time frame, the actual Data Dictionary database and schema (the Data Dictionary schema) will be provided. However, the actual Data Dictionary Service, i.e., DDICT maintenance tool will not be available. Changing the contents of the Data Dictionary database in the Release B.0 time frame is not automated. If a data type has been changed so that changes to the Data Dictionary are required, it will have to be done manually by SEO staff using SQL scripts or commands.

Other than the above mentioned limitations, the capabilities described in the scenario are all provided in B.0.

3.1.3 Advertising Service Scenario

The general capabilities used in this scenario are provided in B.0. The only exception is that the DAAC Science Data Specialist will not be able to be notified of a new Advertisement based on subscription. However, service advertisements can be installed on the Desktop, provided by the Client subsystem, which may (depending on the service and the current client configuration) include downloading software from an ftp server to the client's workstation. This includes both ECS services and external provider services. The Release B.0 Advertising Service will be able to support more formal compliance to the Global Change Master Directory (GCMD) directory level metadata attributes. This provides the user, the DAAC Science Data Specialist in this scenario, with the capability to search on product advertisements using standard keyword specifications.

At Release B.0, there will be no capability to interface between the Advertising Service and Data Dictionary Service (DDICT) to obtain definitions of keywords during use of the Advertising Service interface.

3.1.4 Science Software Archive Package Ingest & Validation

The general capabilities described in the scenario are all provided in B.0. However, the bar code handling of media check-in is not supported in B.0.

3.1.5 Science Software and Integration Testing (SSI&T)

All capabilities described in the scenario are provided in B.0.

3.1.6 Ad Hoc Production

The described capabilities and features in this scenario are provided in B.0.

3.1.7 Standard Planning

Although Standard Planning is a capability in B.0, there are a few functions described in this scenario that will not be available until B.1. First of all, planning for full reprocessing (except for limited ad-hoc reprocessing requests) and on-demand production request are not supported in B.0 time frame. Secondly, there are dependencies in creating production plan. Data availability or data arrival time prediction for L0 data based on Detail Activity Schedulers from FOS are not supported in B.0. The Limited Automatic Replan, described under Production Planning Points of View and in step 5 for Production Planner, will not be available until B.1. Also deferred to B.1 is Resource Planning Upgrade. It includes, for example, the capability to generate reports providing a comparison of planned vs. actual resource usage; to provide site resource plans to Planning subsystem at other sites; and to log the start/end times of ground events it executes.

3.1.8 L0 & Ancillary Data Ingest

For this scenario, the only capability deferred until B.1 is the bar code handling of media check-in. All other capabilities described in this scenario, including data transfer, data conversion, data

checks, archive and status reporting of L0 and ancillary data by Ingest and Data Server subsystems, are supported by B.0.

3.1.9 Standard Processing

Most capabilities described in this scenario are supported by B.0. However, the ability for the operator to place a production job on hold, i.e., suspend and resume of an active PGE, will not be available until B.1. Some other capabilities that are important to the Data Processing, while not described in the scenario, will not be available until B.1. They are the automated start time checker which alerts operators to PGEs which have not started within a threshold of the expected time; advanced exit handling which allows the exit code from a PGE to trigger an on-demand processing request for another PGE; and the predictive staging and job box consolidation (the effect is to reduce number of jobs that can be supported, and has impact only on the GSFC DAAC baseline).

3.1.10 On-Demand Production

The entire scenario, the processing of On-Demand Production Request, OPR, whether the resources used by all the Data Processing Requests, DPRs for the OPR are less than the threshold or are exceeding the threshold, will not be supported until B.1

A new scenario has been defined in this paper to address the workaround for this necessary function in B.0 time frame for ASTER On-demand processing (Section 4.2).

3.1.11 Software Run-Time Error

The general flow of this scenario is all supported by B.0. However, the functionality for the operator to place production job on/off hold, on/off ice (i.e. suspend and resume of an active PGE), in the Change Job States Workflow, will not be available until B.1.

3.1.12 On-Site QA

This scenario focused on science QA by a DAAC Science Data Specialist or SCF Scientist. This capability is provided in B.0. Although, the non-science QA (e.g., check number and size of outputs) capability will be in B.1, local UNIX utilities could be used in B.0 to perform similar task. Under the QA Points of View, the SCF scientist receives notification of a new metadata QA flag from DSS. This capability will be in B.1 because that is when the metadata update subscription service will be available.

3.1.13 Product Insertion and Archive

The general flow of this scenario is supported by B.0. Although not explicitly referenced in the scenario, the Remote Insert capability that allows PDPS to insert standard products into DSS in another DAAC is not available in B.0; there is, however, a workaround (see section 4.1). The data server monitoring tool described in the scenario will not include monitoring performance data in B.0.

3.1.14 Subscription Event Error

The scenario is primarily used to describe the interactions between system, user, user service representative and Ingest/Distribution technician when an error takes place in a subscription request. The capabilities described in the scenario for problem resolution are all supported in B.0. However, there are B.0 limitations imposed upon the described subscription actions that are outside of problem resolution. For Release B.0, use of the subscription service is limited to DAAC operations personnel in support of science data production activities. In B.1, users will be able to place subscriptions through the ECS Client.

3.1.15 Data Distribution

The capabilities described in this scenario are all provided in B.0 with the exception of performance monitoring indicated in Figure 3.2.15.1-1, monitoring of cache utilization and ftp server volume by DAAC Archive Manager, and Viewing Pull Volume Information Workflow in section 3.2.15.6.

3.1.16 DIM/LIM Data Dictionary Update Error

This scenario is not a valid scenario in the B.0 time frame. In the B.0 time frame, the actual Data Dictionary database and schema (the Data Dictionary schema) will be provided, but the full Data Dictionary Service will not be available. If a data type has been changed so that changes to the Data Dictionary are required, it will have to be manually done by SEO staff using SQL scripts or commands. There are no automated ways for changing the contents of the Data Dictionary database in the Release B.0 time frame.

The effect on this scenario is as follows: When the DAAC Science Data Specialist (DSDS) needs to change a data type, the DSDS writes a trouble ticket requesting this change. The trouble ticket will be assigned to the SEO Database Administrator who will analyze the update and determine what needs to be changed. After approval for change, the SEO database administrator will change the Data Dictionary contents using SQL scripts/commands and verify the changes. Once the changes have been verified they will be promoted to operations. The trouble ticket is then closed out.

3.2   The User Services Environment

3.2.1   Order Processing

All capabilities described in the scenario, other than Billing and Accounting, are provided in B.0.

3.2.2   Order Tracking

All capabilities described in the scenario, other than order tracking at the granule level, are provided in B.0. Release B.0 Request/Order Tracking enables User Services to determine the current status of a user's order, while that of the Release B.1 provides the mechanism to track user order and their status, at a request level and at a granule level, as they are processed by multiple ECS subsystems or at multiple DAACs.

3.2.3 Cross-DAAC Tracking

This scenario is not applicable to B.0. The LIM/DIM support to order tracking and Billing and Accounting are deferred to B.1.

3.2.4 General Inquiry

All capabilities described in the scenario are provided in B.0.

3.2.5 Cross-DAAC Referral

All capabilities described in the scenario, other than Billing and Accounting, are provided in B.0.

3.2.6 Restricted Data Access

This scenario as written is not relevant to the B.0 system. The B.0 system will not contain a document data server. However, if the scenario is changed to accessing restricted data from the science data server, the User Services Representative will be able to change privileges in the same fashion upon approval from DAAC management.

3.3 The System Management Environment

3.3.1 System Administration (Restore)

All capabilities described in the scenario are provided in B.0.

3.3.2 Failure During Startup

All capabilities described in the scenario are provided in B.0.

3.3.3 Configuration Management - Software Transfer & Install

All capabilities described in the scenario are provided in B.0.

3.3.4 Billing & Accounting

This scenario does not apply to the B.0 system. The Billing & Accounting functionality will be added for the B.1 system. There will be a workaround to this in the B.0 timeframe that effects only Landsat 7 products archived at the EDC DAAC. The requisite workaround is TBD.

3.3.5 Mode Management

All capabilities described in the scenario are provided in B.0.

3.3.6 Trouble Ticketing

All capabilities described in the scenario are provided in B.0.

3.4 The System Stress Environment

3.4.1 Reprocess Planning

This scenario is not applicable to B.0. The capability for full Reprocess Planning (except for limited, ad-hoc reprocessing requests) is in B.1. Although the general flow of this scenario is very similar to the flow described in the Standard Planning, the focus for this scenario is more on the interactions between various DAAC personnel and ESDIS IWG.

3.4.2 Resource Planning

The general flow of this scenario is supported by B.0. However, the capability to publish a Resource Plan through DSS for review by parties outside the DAAC will be provided in B.1. The scenario is focused on simple, straight-forward resource planning and coordination between the resource planner and the production planner, all within a DAAC. The more complicated capabilities, although not described in the scenario, such as the capabilities of Limited Automatic Replan, On-Demand Production Request, and Inter-DAAC Planning, are deferred to B.1.

3.4.3 Cross DAAC Plan Coordination

This scenario is not supported in B.0 primarily because of the unavailability of the automated Inter-DAAC Planning in B.0. However, in B.0 DAAC A can authorize remote manual review of its plan by DAAC B via remote access to DAAC A's Planning Workbench.

Among the essential capabilities of Inter-DAAC Planning that this scenario depends on are:

1. The capability that allows the Planning subsystem to receive subscription notifications indicating the arrival of Data Availability Schedules (DAS) for any remote ECS site that makes a DAS available;

2. The capability to create a Candidate Plan based on DASes for remote ECS sites or EDOS, as needed;

3. The Planning subsystem identifies conflicts in site production plans caused by cross-DAAC data dependency where a production request that is no longer predicted to be completed by the specified target date may affect production at another site;

4. The Planning subsystem is capable of providing cross-DAAC data dependencies information in production plans.

3.4.4 Data Management Server Saturation

The capabilities described in this scenario, mainly to be able to monitor server performance degradation and to change the allowed number of user sessions, are provided in B.0. However, the cross DAAC search and coincident search capabilities, described as the possible causes for server overloading, will not be available in B.0.

3.4.5 Request Segmentation

The capabilities described in this scenario, Request Partition and Order Segmentation, will not be provided in B.0.

3.5   The SMC Unattended Operations

3.5.1 Autosys Abends

All capabilities described in the scenario are provided in B.0.

3.5.2 COTS Hardware Failure

All capabilities described in the scenario are provided in B.0.

3.5.3 Data Management Server Saturation

All capabilities described in the scenario are provided in B.0.

3.5.4 Runaway PGE

All capabilities described in the scenario are provided in B.0.

3.5.5 Science Data Server Abends

All capabilities described in the scenario are provided in B.0.

This page intentionally left blank.

4. New Operations Scenarios for Release B.0 Workarounds

In the section of Release B.0 Workarounds in Release B Replan Functionality by Phase for the ECS Project, a number of workarounds are described. Three of them are herein expanded into operations scenarios to further examine details of functional flow and operator/system interactions. In this section, scenarios for DAAC-to-DAAC File Transfer (Remote Insert) and ASTER On-Demand Processing are presented. The details of Billing & Accounting workaround are still TBD.

4.1 DAAC-to-DAAC File Transfer (Remote Insert)

There are some products that will be produced at the GSFC DAAC and archived at either the EDC DAAC or the NSIDC DAAC. The ability to directly insert data produced at one DAAC into a Data Server at another DAAC is not supported until the B.1 Release of ECS. This scenario describes how this functionality may be achieved with the B.0 Release of ECS. The scenario specifies EDC as the remote DAAC; however, the exact same procedure will work for NSIDC. Simply put, a remote acquire is used by the receiving DAAC, in place of a remote insert by the originating DAAC.

4.1.1 DAAC-to-DAAC File Transfer (Remote Insert) Description

Assumptions:

1. 2 ESDTs have been defined for each product to be remotely inserted, 1 at GSFC (ESDT_G) and 1 at EDC (ESDT_E).

2. EDC DAAC has an "Acquire PGE" for each product requiring remote insert which simply lists the GSFC version of the ESDT as input and the EDC ESDT as output, and copies the file from one DAAC to the other. These PGEs will be developed by ECS.

3. The temporal range of Production Requests entered by the GSFC and EDC Production Planners match.

4. There are no PGE or ECS errors.

Scenario:

1. At GSFC, the Production Planner enters a Production Request to run the PGE which will produce the data to be archived at a remote site.

2. The GSFC Production Planner includes the Production Request in a Production Plan and then activates the plan.

3. At EDC, the Production Planner enters a Production Request to run the "Acquire PGE". Note that, if a subscription does not already exist, this will automatically create a subscription for the ESDT_G data type.

4. The EDC Production Planner includes the Production Request in a Production Plan and then activates the plan.

5. The input data required for the GSFC PGE is (or becomes) available.

6. The GSFC PGE runs, produces a granule of ESDT_G data which is inserted into the GSFC Data Server.

7. The Insert of ESDT_G at GSFC automatically causes a subscription notification to be sent to PDPS at EDC.

8. PDPS at EDC receives the notification (which includes metadata about the ESDT_G granule just inserted at GSFC) and checks to see if it has any jobs which are waiting for that granule (it does).

9. The "Acquire PGE" runs at EDC and remotely acquires the ESDT_G granule from GSFC and produces an ESDT_E granule.

10. The ESDT_E granule is inserted at EDC where it becomes available to any other processes which require it as input.

Notes:

1. Steps 1-4 are operator steps which are described in Standard Planning scenario in Release B SDPS/CSMS Operations Scenarios for the ECS Project

2. Steps 5-10 are all automatically performed by the system, therefore Points of View is not provided here.

3. Steps 5-10 may be repeated many times for each time that steps 1-4 are performed, depending on the duration of the Production Requests.
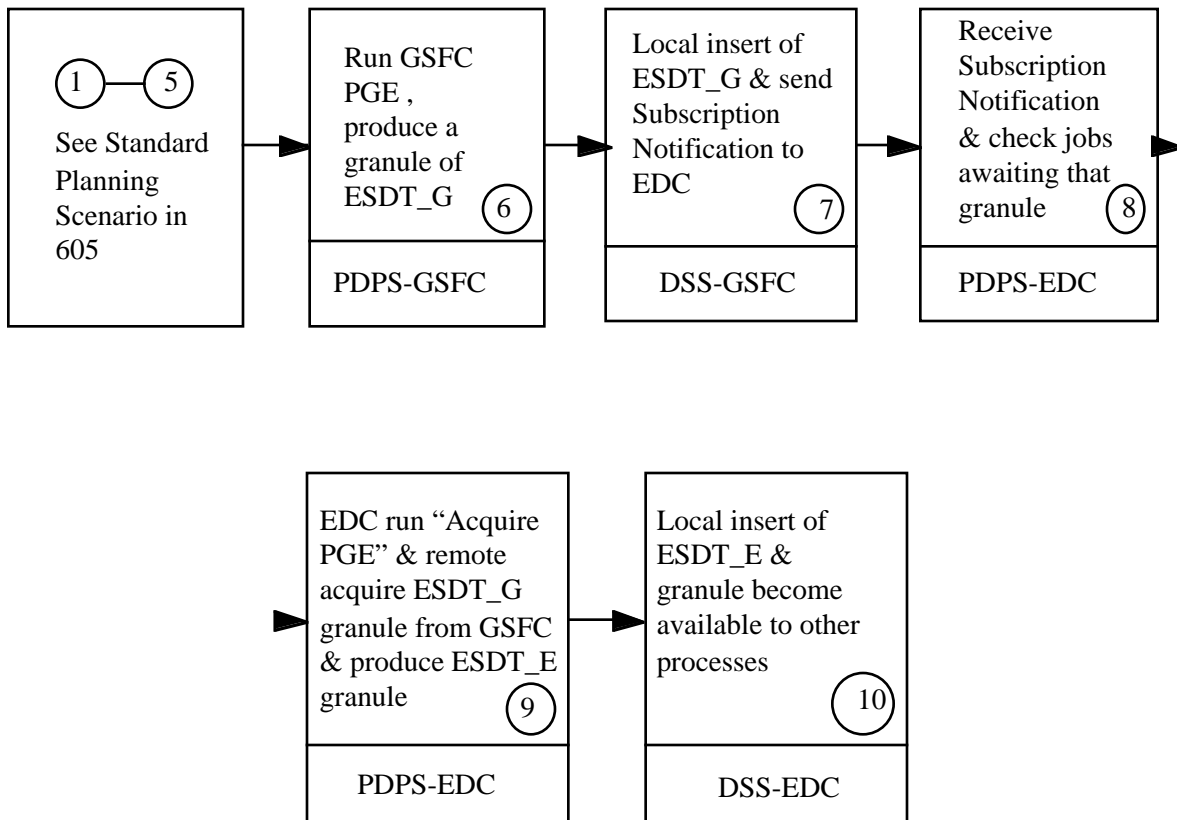
Figure 4.1.1-1. DAAC-to-DAAC Data Transfer (Remote Insert of Data in B.0) Functional Flow

4.2 ASTER On-Demand Processing

B.0 does not support on-demand processing and there is no direct user interface to invoke production processing for requested ASTER products. Manual entering of on-demand processing request will be needed as the workaround for B.0. This means that such requests will be entered manually through the PLS Production Request Editor. This workaround supports users who submit requests for ASTER products and SCF scientists who submit requests for QA processing of such products. These requests must be routed through User Services, who will place them. User Services will also generate subscription that notifies the request originator when the ASTER product becomes available.

4.2.1 ASTER On-Demand Processing (B.0 workaround) Description

During the B.0 timeframe, ASTER on-demand processing will be supported through requests submitted by users and SCF scientists (via e-mail) to DAAC User Services. User Services is responsible for acknowledgment of the request, fulfillment of the request using PDPS and DSS services and tools, and notification to the request originator of the product availability. User Services is also responsible for validation of the service request.

Users and SCF scientists will obtain information regarding each type of ASTER product available from ECS from a template accessible via Advertisements and Bulletin Boards. The template contains default run-time parameters for the requested products and any required (or potentially required) prerequisite intermediate product. Documentation associated with the template will guide the request originator through the process of formulating their request. The specific granule to be produced is identified by the start and stop time. Users and SCF scientists will attach the completed template to an e-mail message that defines their specific request for an ASTER product. Upon the receipt of a request for an ASTER product, the DAAC User Services will validate the request.

On determination that the request is valid, User Services will access the Production Request Editor and enter the production request into the production plan for scheduled DPR processing. User Services will also enter a subscription for the product, which serves to notify the request originator when the product is available. In some cases, more than one PGE needs to be run in order to produce the desired ASTER product from the available input data. (This is referred to as "backwards chaining".) In this case, User Services will need to enter two or more production requests into the production plan. Even if more than one PGE is required to produce the desired ASTER product, only one subscription (for the end product) is needed.

The request for the ASTER product is completed when the user or SCF scientist receives notification of the availability of that product.
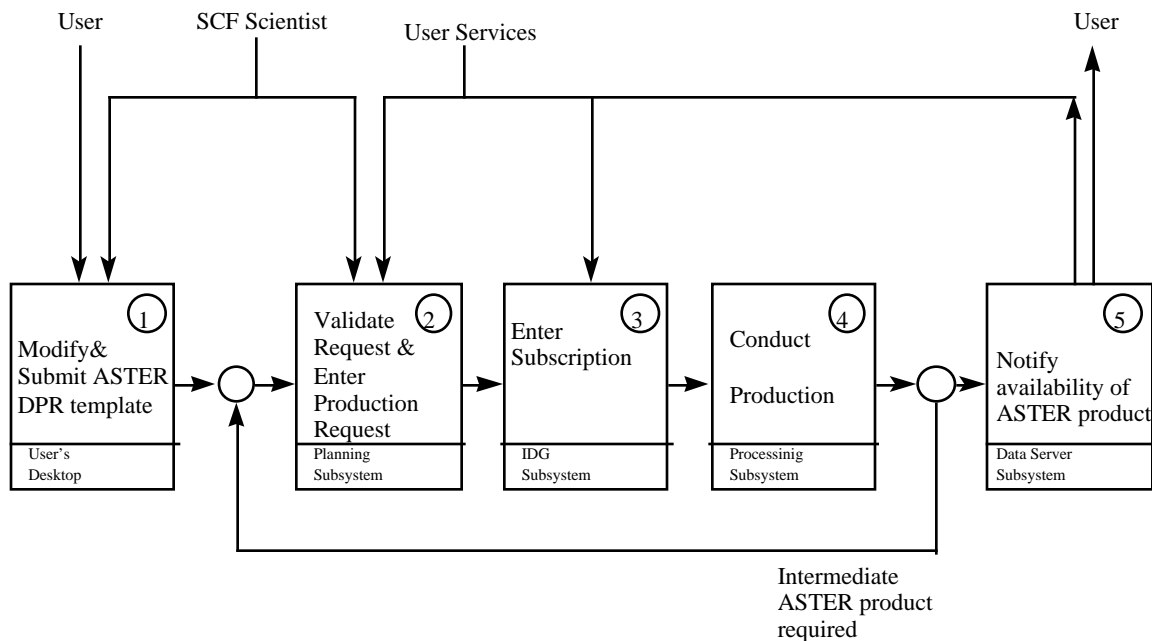

Figure 4.2.1-1. ASTER On-Demand Processing (B.0 Workaround) Functional Flow

4.2.2 ASTER On-Demand Processing (B.0 workaround) Operator Roles

User Services - Receives an e-mail message containing a production request for an ASTER product, validates production request, enters production requests for requested ASTER product and any intermediate ASTER products required to produce the requested product into the Production Request Editor, and enters a subscription for the requested product.

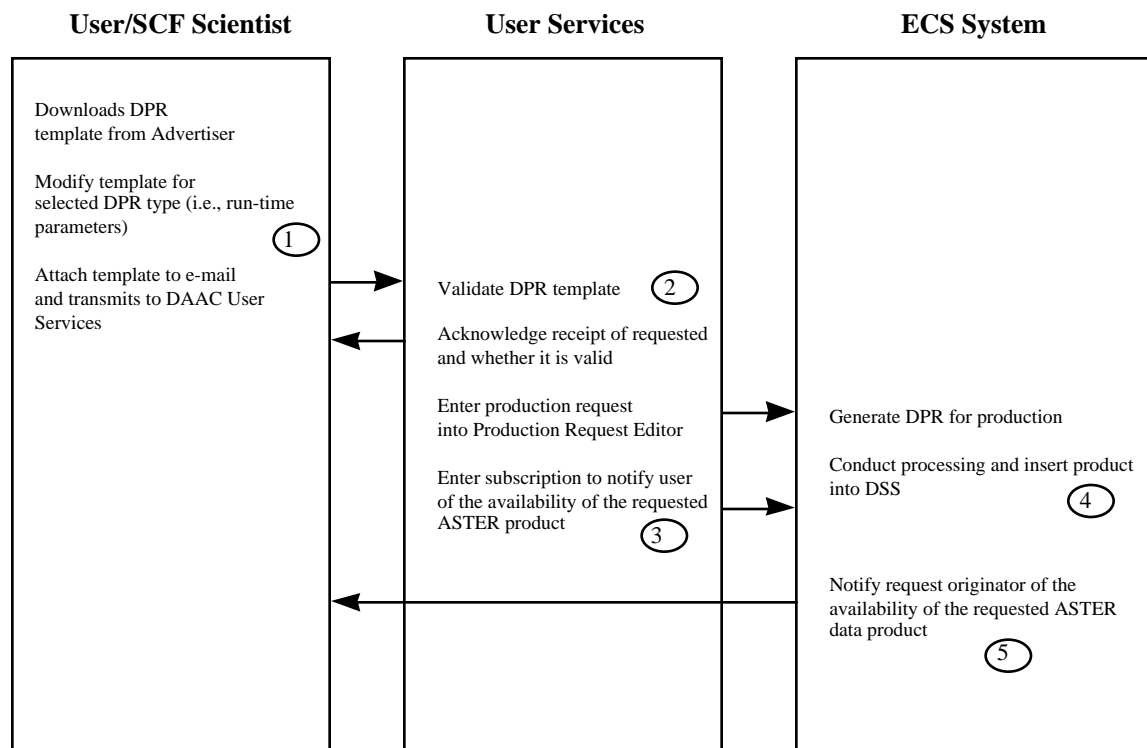## 4.2.3 ASTER On-Demand Processing (B.0 workaround) Points of View

User/SCF Scientist	**User Services**	**ECS System**
Downloads DPR template from Advertiser		
Modify template for selected DPR type (i.e., run-time parameters) ①	Validate DPR template ②	
Attach template to e-mail and transmits to DAAC User Services	Acknowledge receipt of requested and whether it is valid	
	Enter production request into Production Request Editor	Generate DPR for production
	Enter subscription to notify user of the availability of the requested ASTER product ③	Conduct processing and insert product into DSS ④
		Notify request originator of the availability of the requested ASTER data product ⑤

Figure 4.2.3-1. ASTER On-Demand Processing (B.0 Workaround) Points of View

4.2.4 Work Flow Diagrams for ASTER On-Demand Processing (B.0 workaround)

The purpose of this workflow is to provide an overview of the production planning steps required for ASTER on-demand processing. This workflow only contains the flow for the User Service's operator role in: (a) acknowledging the receipt of a production request from an authorized user (the request originator), (b) entering the production request into the Production Request Editor, (c) setting up the subscription for the production request, and (d) assuring the notification of the request originator of the availability of the requested ASTER product. The actions required to support these operations during B.0 involve entering data via a command line, therefore a workflow diagram that depicts the operations via a graphical user interface (GUI) is not required and therefore not shown here.

This page intentionally left blank.

Abbreviations and Acronyms

BAAS	Billing and Accounting Application Service
CCB	Configuration Change Board
CCR	configuration change request
CDRL	Contract Data Requirement List
CLS	contact log service client subsystem
COTS	commercial off-the-shelf
CSDT	Computer Science Data Types
CSMS	Communications and Systems Management Segment
DAAC	Distributed Active Archive Center
DAM	DAAC archive manager
DBA	database administrator
DCE	distributed computing environment
DCN	document change notice
DIM	distributed information manager
DIT/DDT	DAAC Ingest / Distribution Technician
DLL	dynamic linked library
DPR	data processing requests
DPS	data processing subsystem
DS	data specialist
DSS	data server subsystem
ECS	Earth Observing System Data and Information System Core System
EDC	EROS Data Center
EDOS	Earth Observing System (EOS) Data and Operations System
EDS	Electronic Data Systems Corporation
EMC BAAS	Enterprise Monitoring and Coordination Billing and Accounting Application Service

EOS	Earth Observing System
EOSDIS	Earth Observing System Data and Information System
EROS	Earth Resources Observations System
ESDIS	Earth Science Data and Information System
ESDT	Earth Science Data Types
ESST	Earth science search tool
FOS	Flight Operations Segment
GFE	government furnished equipment
GUI	graphical user interface
HPOV	Hewlett Packard OpenView
HTML	hypertext markup language
ICDs	interface control document
IDR	Incremental Design Review
ILM	inventory/logistics/maintenance
IWG	investigator working group
LIM	local information manager
LPS	Landsat Processing System
LSM	local system management
LaRC	Langley Research Center
M&O	Maintenance and Operations
MSS	Management Subsystem
MTPE	Mission to Planet Earth
NOAA	National Oceanic and Atmospheric Administration
NSIDC	National Snow and Ice Data Center
OPR	on-demand product requests
PDPS	planning and dataprocessing
PGE	product generation executive
PGS	product generation system
PRT	product request tool

QA	quality assurance
QAE	quality assurance executive
RDBMS	relational database management system
SCF	Science Computing Facility
SDPF	Sensor Data Processing Facility
SDPS	Science Data Processing Segment
SEO	Sustaining Engineer Organization
SMC	system monitoring center
SSAP	science software archive package
SSI&T	science software intergration & test
TSDIS	TRMM Science and Data Information System
TT	trouble ticket
TTS	trouble ticketing service
UI	user interface
UR	universal reference
US Rep	User Services Representative